

DECEMBER '13 ISSUE

PARTICLE POST

COLLIDER-ACCELERATOR DEPARTMENT

Contact: [C. Scholl](#)

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A WORD FROM THE:

Administration

Accelerator Div.

ES&F Div.

Acc. R&D Div.

Operations

 Safety Stats

Quote of the Month: "As soon as man does not take his existence for granted, but beholds it as unfathomably mysterious, thought begins." - Albert Schweitzer

NOTE FROM OUR CHAIR: Thomas Roser



Two weeks ago the C-AD Machine Advisory Committee reviewed the latest design for eRHIC, the polarized Electron Ion Collider we are proposing at RHIC. The highly cost-effective design uses a 1 GeV superconducting linac and two electron rings in the RHIC tunnel that use Fixed Field Alternating Gradient (FFAG) optics with permanent magnets. These FFAG rings are the latest application of this concept developed by Dejan Trbojevic. With FFAG, constant field magnets can be used to transport beams with widely different energies, in our case from 3 to 10 GeV, in one small aperture vacuum chamber. This new design replaces six rings with normal optics with just two FFAG rings while at the same time needing only a 1 GeV instead of a 2 GeV Linac.

Many people worked hard to prepare for the review and the outcome was very positive. The committee was very impressed by the eRHIC design and "congratulated the eRHIC design team for its ingenious novel use of the FFAG concept." Congratulations to everybody!

DID YOU KNOW??

Check out who received an employee Service Award this year! 2013 Collider-Accelerator Dept. employees who received a Service Award are listed [here](#). Last Years Service Awards are listed [here](#).

Check out Steve Bellavias' current Photos! [Comets & Moon](#)

Did you know the 1st Computer Tennis Game was created right here at Brookhaven?

[Read about](#) the 1958 innovation that earned a prominent place in the history of video games.

EVENTS/SEMINARS...



Check out the [BNL Calendar](#) for upcoming events & Seminars or the [Upcoming Conferences & Workshops](#) page for workshops and Conferences happening at BNL.

Dec. 10 - (Bldg. 510 SCR | 11:00) Nuclear Physics Seminar, "System-size dependence of open-heavy-flavor production in nucleus-nucleus collisions at $\sqrt{s_{NN}}=200\text{GeV}$ " Presented by Nicole Apadula (SBU)

Dec. 10 - (Bldg 510 LSR | 3:30) Physics Colloquium, "Big News from Small Systems: A New perspective on $p(d)+A$ Collisions", Presented by Anne Sickles (BNL)

WHAT'S GOING ON IN OUR NEIGHBORHOOD?

Interested in Cycling? Why don't join in on the .. [Piermount Bike Festival](#)

Interested in Running or Walking? Check out the [Running August Calendar](#) for the following events: LIRRC Mike & Michelle 4 mile; North Shore boys & Girls Club 5k, Tough Cookie 8k Trail Race and cookie extravaganza, Santa's Toy Trot, LIRRC Winter Snowflake.

For the Kids. Disney on Ice & WWE RAW (January) @ [The Nassau Coliseum](#).

Stony Brook Events:

White-A-Thon: Oct 28-Dec 19 (9~) Custom Teeth Whitening kit \$150.

The Lucille Ball & Red Skelton Stories: A Musical Theater Event ~ Nov. 16-Jan 12 (11:30am & 12:30pm) \$48pp

Promenade of Trees: Dec. 8 ~ Jan. 1(1pm~)

Nassau Coliseum ~

Upcoming shows: Trans Siberian Orchestra; DeadMau5; JayZ; Brad Paisley & More

Check out Erik Forsyth's Travel's:



Dec. 18 - Collider- Accelerator Department Breakfast! Please feel free to bring a dish of your own and contact Lynanne DiFilippo with your ideas!

IN OTHER NEWS...

The World's Oldest Astronomers ~ Japan use ancient trees to look back on the history of our local cosmos, and discover a mystery. [Read more..](#)

First Patient Treated with DMLC Tracking?? ~ *A dynamic multileaf collimator has been used to track a moving tumour with a therapeutic X-ray beam for the first time in Sydney, Australia.....* [Read more](#)

New Solar Cell Material Acts as a Laser As Well ~ [Read about it..](#) The family of crystals known as perovskites could be used to make cheap lasers.

DAY AT THE VINEYARDS...

Macari Vineyard ~ [MATTITUCK] No upcoming events at vineyard.

Duckwalk North ~ [SOUTHOLD] No Events Posted

Duckwalk South ~ [WATER MILL] No Events Posted

Castello di Borghese Vineyard & Winery ~ [CUTCHOQUE] ** Vineyard Tours & Wine Tastings Every Thursday & Sunday @1pm & FREE Jazz Every Saturday (2-4) with Marguerite Volonts**

Jamesport Vineyards ~ Any weekend in December come in with a non-perishable food item and receive our Holiday Flight on the house!

Dec 21st: Oyster and Wine Pairing, 6-8pm, \$20 per person (\$10 per person for Wine Club Members.)

Feb 8th-Mar 16th: [Live on the Vine](#) (Acts and times TBA)

Martha Clara Vineyards - [RIVERHEAD] ~ **Live Music every weekend**

Palmer Vineyards - [RIVERHEAD] No Events Posted

Pindar Vineyards - [PECONIC] ~ No Events Posted

Baiting Hollow Farm Vineyard ~ [CALVERTON] *Music every Sat & Sun from (2-6)*

NOTE FROM OUR ADMINISTRATION: Stephanie LaMontagne-McKeon



RHIC's operating schedule is typically developed when our Presidential Budgets are prepared, nearly one year in advance of the RHIC Run. Our FY2014 Presidential Budget (prepared in February of 2013) would have provided an increase of ~\$7 million in operating funds to support 22 weeks of RHIC cryogenic operations. However, as has been the case for the last several years, Congress has yet to approve the FY2014 budget and we are, once again, operating on a Continuing Resolution and receiving funding based on our FY2013 budget.

What does this mean to us? At some point, we WILL be provided with a FY2014 budget, the amount of which is unknown at this time. Consistent with our mission, preparations for RHIC Run 14 are proceeding as planned and the rate of expenditure for materials reflects this. As you begin to formulate plans for the FY2014 shutdown, please keep in mind that without an increase in funding, material purchases may be severely constrained on the back end of the year. Spend wisely and make every dollar count!

NOTE FROM OUR ACCELERATOR DIVISION: Wolfram Fischer



BLIP operation is scheduled to start on 16 December. For the Linac the access control group has installed and commissioned a modern access control system, now ready for this year's operating period.

At EBIS, the installation of the new Laser Ion Source (LION) is under way. When fully commissioned the new source will significantly enhance our capabilities by allowing rapid switching between species, and providing many more species than the currently available two.

The start of the 4K cool-down of RHIC Run-14 is scheduled for 3 February 2014. This will still allow for 22 cryo-weeks before the end of June. In preparation for the RHIC Run new hardware is installed. The most important upgrade will be the new 56 MHz SRF system. The longitudinal stochastic cooling system is upgraded with new detectors and kickers, and the electron lens hardware will be completed. A transverse damper will be installed and tested in Run-14.

NOTE FROM OUR EXPERIMENTAL SUPPORT & FACILITIES DIVISION: Phil Pile



We are on schedule for a 3 February start for cool down to 4 deg K, a delay of one month to accommodate a delay in delivery of the 56 MHz RF system, an important upgrade for full energy gold beams in Run 14. Further delays in the 56 MHz system should not, however, result in an additional delay. As I reported last month, the run plan remains the same with a short low energy run followed by a long full energy gold-gold run with a total of 22 weeks of cryo operation. If these runs go as planned, and Stochastic cooling works as well as it has in the past, we should have time left for another short run with beams to be determined. However, we still do not have a final budget so our plans for 22 weeks of RHIC operations could change. Hopefully by mid-January (or earlier) the budget situation will be resolved. Our plan for installation of a gold foil target inside the STAR IR beam pipe is holding. Both STAR and PHENIX will be ready, with new silicon vertex trackers, for collisions in early February..

BLIP and the Building 801 Target Processing Lab (TPL) are preparing for first beam from the LINAC on 17 December, one day later than planned. The first RbCl target array is planned to be inserted into the beam on 20 December. A lot of effort is still going into remediation of findings from the September DraxImage (Strontium-82 customer) audit. Today (6 December), an audit by Bracco Diagnostics is in progress. Bracco is a supplier of CardioGen-82 Rubidium 82 (Rubidium is the decay product of Strontium-82) generators to hospitals, used for Positron Emission Tomography (PET) imaging of the heart. The audits check our compliance with "Current Good Manufacturing Practices" (CGMP) for Strontium-82 production. Full compliance with CGMP is a challenge and we are committed to meet the challenge and come into full compliance later in the year. The new LINAC beam raster project I talked about last month for BLIP is set to begin procurements once the Project Execution Plan (PEP) is approved by DOE. Approval is expected sometime this month. The plan is to install the necessary components during the next two RHIC shutdown periods, a challenge.

NASA sponsored NSRL experiments for the fall began on 7 October and ran through 15 November followed by a one week run in support of the National Reconnaissance Office (NRO). The annual review of NSRL operations by NASA will be held next Wednesday, 11 December. We are confident the review will be favorable. We expect to begin the Spring NSRL runs in March with one week of NRO experiments followed by NASA experiments through June.

NOTE FROM ACCELERATOR R&D DIVISION: Ilan Ben-Zvi



November was a great month for the superconducting crab cavity project. The Proof of Principle cavity has been successfully cold tested with very nice results. Under 4 K and 2 K tests, the cavity has reached a quality factor of 1.25×10^9 and 3.9×10^9 respectively. Furthermore at 2 K, the deflecting voltage has reached 4.6 MV in CW mode before quenching, and the corresponding peak surface magnetic field was 109 mT. This result exceeded the 3 MV deflection voltage requirement set by CERN by more than 50%. This is the first successful cold test for quarter wave deflecting cavities. We will present our results in the LHC Crab Cavity Workshop at CERN. Following this big step forward, we move on with the design of the dressed crab cavity.

ERL: Preparations for the low power beam test are under way.

56 MHz SRF cavity for RHIC: An HOM coupler from JLab will be delivered this week for installation on the cavity. The "quiet helium source" for this cavity has been delivered to IP4 for installation.

Photocathode R&D: This month we saw the successful test of the resonant circuit for the Gatling Gun combiner magnet. The frequency achieved was over 670 kHz without overheating and with some tuning 704 could certainly be achieved. This shows that the new proposed frequency of 450kHz should be no problem to achieve.

SRF VTF: The NSLS-II cavity is under preparation for vertical testing, which is scheduled for the week of December 16. The BNL3-1 cavity has been processed at AES and will be delivered ready for vertical testing soon.

Major components of the CeC experiment are being made in industry and collaborating sites. Niowave is continuing work on the 704 MHz accelerator cavity. Budker INP has finished production of the first set of cartridges (permanent magnet holders) for the helical undulator.

Summary for LEReC (Low Energy RHIC electron Cooling):

- An engineering baseline has been established
- Work on new design of SRF cavities (84.5 MHz) is underway
- Detailed cost estimate based on the WBS were conducted
- Risk assessment and management is in progress
- Project documents needed for the DOE review are in preparation
- Safety design review process started

At the ATF, this month saw the first complete run of UCLA's user experiment "Plasma Wakefield Acceleration in the Quasi-nonlinear Regime" in a new experimental chamber. 60-MeV electron beam has been focused to 6 μm at the entrance of a plasma channel. Observed plasma blowout ("bubble"), results in the beam focusing and energy modulation. Data analysis is underway.

In other news, the C-AD Instrumentation Systems group took advantage of the ATF's linac for beam testing of their "button" BPM system (Libera Brilliance Single Pass Box) which is to be installed in various accelerators. The ATF is regularly used for early testing of beam instrumentation for future facilities.

Parallel experimental activity continued with the ATF's CO_2 laser where progress has been achieved with putting on-line a new Optical Parametric Amplifier that will soon reduce the laser pulse length and increase the peak power.

First results have been obtained on generating picosecond CO_2 laser pulse trains for another user experiment conducted by Radiabeam Company. These trains will be ultimately used for generating high-repetition x-ray pulses via Compton scattering for metrology of Extreme Ultraviolet Lithography.

NOTE FROM OPERATIONS: Paul Sampson



Shutdown '13 continues with major works progressing in RHIC and elsewhere. NSRL run 13C and NRO runs were completed in November. While RF development with gold from EBIS continued into Early December. The goals of setting the bunch merge and Booster to AGS synchronization were achieved.

In RHIC, major projects are entering the final stages. With startup less than 2 month away, many major installations are still pending, almost all of which require bake-out. The e-lens installation at IR 10 continues with many groups working together including Cryogenics, power supply, survey, instrumentation and others. The schedule has most of the assembly completed by the end of December.

Installation of components for the 56 MHz SRF cavity is ongoing with installation of the cavity itself scheduled for early January. The new kickers for the longitudinal Stochastic cooling system are being assembled and will be installed late in the shutdown. Repair of the Blue longitudinal damper is nearly complete. Installation of the damper as well as a new stochastic cooling pickup and IPM components will begin mid December with the bake-out to

follow. Installation and testing for CeC in IR 2 continues. Footings for the laser "hut" have been poured and the building is scheduled to be in place this month. Maintenance, repair and upgrades to other major systems also continue.

Work on the EBIS source will continue throughout the Booster down period as will installation of the Laser Ion Source for EBIS.

The new LINAC Access Controls system has been certified and is presently utilized during RF testing. Beam development with the high intensity source will begin mid month. The first BLIP irradiations are scheduled for December 20th.

Other work in the pre injectors includes installation of the Laser Ion source, OPPIS PLC upgrades, HEBT vacuum refurbishment, work on the Laser Profile Monitor and LINAC maintenance.

In the AGS, design for modifications to the D5 Horizontal eIPM and fabrication of the new D15 eIPM is also moving forward. D5 will be removed from the ring this month and installed on a Maintenance Day after modifications are completed. A new cold head has been installed on the AGS A20 cold snake replacing an underperforming head. The CNI polarimeter will be closed up without targets or sources initially and modified on a maintenance day during the run.

Other CAD area infrastructure repairs, including electrical distribution repair, maintenance and upgrades, also are continuing on schedule.

The CAD CATV system display includes daily updates including Testing, power disruptions and outages as well as important dates. This information can also be seen on the web at [RHIC Broadcast](#).

To view a list of the approved work for maintenance days or the shutdown, go the [Job Request System](#) and select the appropriate date. This link is behind the firewall and requires privileges to view.

For schedule updates see: [This Week, which can be viewed by all](#).

DEPARTURES: Farewell, you will surely be missed..

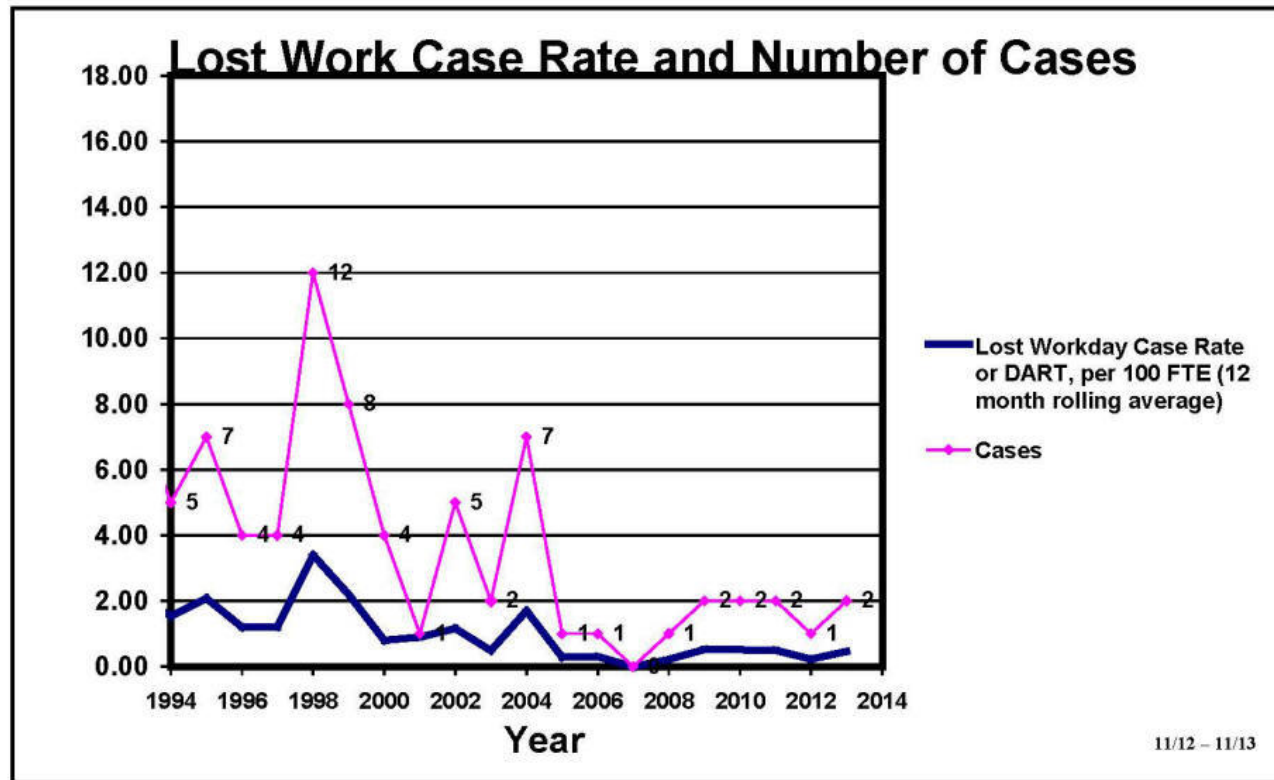
Susan Kennell-Helston - (Controls Systems) - last day was Friday, December 13, 2013 - Retiring

Ray Zaharatos - (Maintenance Support) - Last day is December 20, 2013 - Retiring

Frank Dusek - (C-A Support) - Last day is January 3, 2014 - Retiring

Lawrence Arnold - (Beam & Exp. Services Group) - Last day is January 3, 2014 - Retiring

John Pepe - (Accelerator Controls) - Last day is January 6, 2014 - Retiring



C-AD Occupational Injury Statistics

For Year 2013 For Year* 2014

First Aid Cases	5	0
Recordable Cases	3	0
Lost Work Cases	2	0

* Calendar Year through 11/13

PHOTOS BY: STEVE BELLAVIA

A few photos over a couple of months...

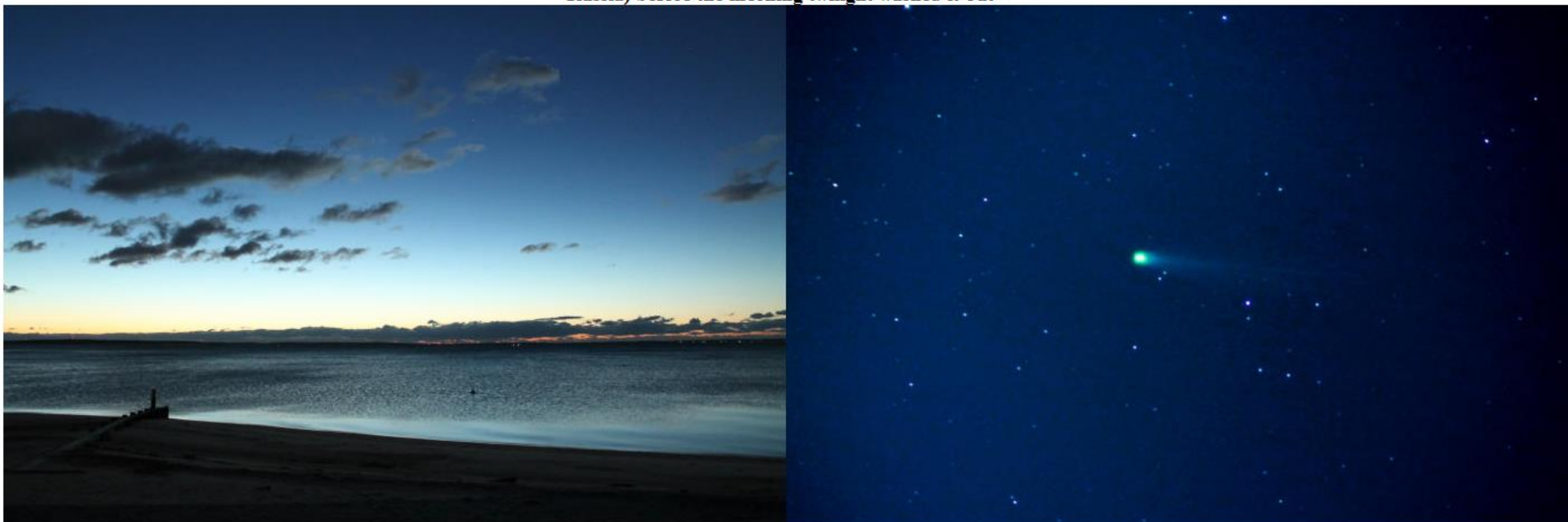
A photo Steve took near the peak of the Penumbral Lunar eclipse, Friday, October 18th.



"This comet is still outshining the "Comet of the Century", ISON, so I got up 3AM Thursday morning and photographed it (Lovejoy), instead of ISON.



"The clouds parted around 5:10 AM in Mattituck Nov. 19, leaving just enough time to find and photograph comet C/2012 S1, "ISON" (International Scientific Optical Network, of Russia) before the morning twilight washed it out"



Comet C/2013 R1 (Lovejoy), Dec. 4, 2013

